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Issue #42

The free newspaper for Pick™ users.

January 1988

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Automating the shipping counter

Does your company make a lot of United Parcel or Postal Service shipments? Or use any shipper that publishes big charts for calculating shipping charges? How are your shipping clerks computing shipping charges? Are they doing manual table lookups every time they need to know the cost of a shipment?

A surprising number of companies either calculate their shipping charges by hand, or let the shipper compute the charges for them. One technique is slow. Both techniques are unreliable. Without much effort, your computer can be doing the work for you.

Let's use UPS shipping as an example. A ground shipment's cost depends on first knowing the "zone" a package is going to. Destination zones are numbered from 2 to 8, with zone 2 being nearby, and zone 8 further away. To determine the correct destination zone, you look up the destination ZIP code on a UPS "zone chart". Different zone charts are available for the various ZIP codes from which the package might be originating. For example, our ZIP code is 95003,

so we use UPS zone chart 7232, which declares that shipments to nearby ZIP codes like 936XX through 954XX are going to zone 2, while shipments to distant ZIP codes like 400XX through 418XX are going to zone 8.

Once we know the ground shipment's destination zone number and the package's weight, we can look up the cost of the shipment on the UPS cost chart. The cost chart is a large 7 x 70 matrix showing the shipment cost for all possible weights from 1 to 70 pounds and all the seven possible destination zones 2 through 8. The cost table for air shipments also has 70 rows for 1 to 70 pounds, but only 3 zone columns (48 states, Hawaii, Puerto Rico), while the express air table has just 2 columns (49 states, Puerto Rico).

A program to automatically calculate shipping charges should only have to ask for the destination ZIP code and the type of shipment (ground, air, or express), then look up the cost by using the necessary tables.

The zone chart can be represented by a single item consisting of a multivalued list of three-digit ZIP code prefixes, and a multivalued list of corresponding zone numbers. Although UPS charts show the beginning and ending ZIP ranges for a zone, our program will only need the

ZIP that ends a zone. For example,

ZONE.CHART
001 374]375]379]381]385]387...
002 8]7]8]7]8]7]...

is the beginning of the actual zone chart item for our region, showing that destination ZIPs 374XX and below are zone 8, 375XX is zone 7, 376XX through 379XX are zone 8, and so on. It only takes a minute or two to type in the chart, which contains 82 values in each attribute. If you're creating a lot of zone charts for different originating ZIP codes, or if you prefer better input validation, you can create the ZONE.CHART item with a program like

```
MAKE.ZONE.CHART
001 OPEN "MD" ELSE STOP "No MD!"
002 ZONE.CHART = ""
003 LOOP
004 CRT "3-digit prefix":; INPUT ZIP
005 UNTIL ZIP = "" DO
006 IF ZIP MATCHES "3N" THEN
007 LOCATE ZIP IN ZONE.CHART<1>
    BY "AR" SETTING POS THEN
        CRT "Already have it!" ELSE
008 CRT "Zone number":; INPUT ZONE
```

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```

009 ZONE = INT(ZONE)
010 IF (ZONE>=2) AND (ZONE<=8) THEN
011 INS ZIP BEFORE ZONE.CHART<1,POS>
012 INS ZONE BEFORE
    ZONE.CHART<2,POS>
013 END ELSE CRT "Bad zone!"
014 END
015 END ELSE CRT "Bad prefix!"
016 REPEAT
017 WRITE ZONE.CHART ON "ZONE.CHART"
018 STOP
019 END

```

The UPS 7 x 70 cost chart is a bit more of a problem. Having to enter almost 500 miscellaneous cost amounts to create that table is a very unappealing job. Fortunately, a little inspection reveals that there is more or less a pattern to the table's contents. For example, when shipping to zone 2, the cost for packages above 2 pounds in weight goes up by 8¢ for each pound,

except every 4 pounds, when there's a 9¢ increase. After 50 pounds, there's a 2¢ increase per pound. (Except at 59 pounds, which has a 3¢ increase!) That means we can use a program like

```

MAKE.COST.CHART
001 OPEN "MD" ELSE STOP "No MD!"
002 COST.CHART = "" ; ZONE = 2
003 FOR WEIGHT = 1 TO 70
004 PREV.COST=COST.CHART<ZONE,WEIGHT-1>
005 BEGIN CASE
006 CASE WEIGHT = 1
007 COST.CHART<ZONE,WEIGHT> = 116
008 CASE WEIGHT = 59
009 COST.CHART<ZONE,WEIGHT> = 539
010 CASE WEIGHT > 50
011 COST.CHART<ZONE,WEIGHT> =
    PREV.COST+2
012 CASE MOD(WEIGHT,4) = 1
013 COST.CHART<ZONE,WEIGHT> =
    PREV.COST+9
014 CASE 1

```

```

015 COST.CHART<ZONE,WEIGHT> =
    PREV.COST+8
016 END CASE
017 NEXT WEIGHT
018 COST.CHART<ZONE,1> = 123
019 WRITE COST.CHART ON "COST.CHART"
020 STOP
021 END

```

to automatically generate an item containing all 70 costs for UPS ground zone 2. To find the cost for a given weight from 1 to 70 pounds, just pick the corresponding multivalue from 1 to 70 in the attribute equal to the zone number (2).

Similar effort at analyzing the UPS charts can be made to discover the relationships that generate the remaining costs for zones 3 through 8 in the table, plus the tables for air rates and express air rates. That will be left as an exercise for the reader. However, remember to spend your time wisely. Don't forget that a good typist (or at

B-TREE-P

B-trees for Pick systems.

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Immediately display any record in any file just by typing one or more starting characters that match any field in the record. You can display not only a selected record, but also any previous and next records, using any sort order you specify. You can jump to any record in a file at any time, then browse through the file by scrolling up or down, a record at a time or a page at a time, in any sort order.

As one of Semaphore's programmers says: "We often ask ourselves why we waited so long to create B-TREE-P. After using it for our own production work, we wonder how we ever got by before without it. A Pick computer without B-TREE-P is like a car without wheels".

B-TREE-P is a proven collection of BASIC subprograms for using B-trees on your computer system. B-trees allow any of the data in any of your files to be instantly located and displayed in any sort order, without having to wait for SORT or SELECT commands.

B-TREE-P and a few optional minor modifications to your existing data entry programs are all that is necessary for you to immediately be able to search, browse, display, or print your data quickly and conveniently. Modifications to your existing data files are absolutely unnecessary!

Here are a few of the ways our customers have put B-TREE-P to work:

- Within minutes of loading the B-TREE-P source code, one of our first customers began using B-TREE-P's standard "browser" for searching a 120,000+ record customer master file. Any name, company, or address can immediately be located and displayed, just by typing one or more characters that match the field. No more waiting for SELECTs!

- Another customer has set up B-TREE-P for purchase order inquiries. A file of multivalued line items and submultivalued delivery dates and quantities can instantly be viewed by item or by date. Pages can be scrolled at the terminal, forward or backward. Any range of data can be

printed. No more waiting for SORTs!

- A California county jail uses B-TREE-P for inmate cash accounting. Although cash records are filed by inmate booking numbers, B-TREE-P allows a list alphabetized by the name attribute to be displayed at all times, even as records are created and deleted at other terminals. Any inmate record (or nearest match) can be immediately found and displayed just by typing one or more characters in a name.

- A manufacturer uses B-TREE-P to let marketing personnel instantly display sales orders six different ways: by part, by description, by ship date, by sales rep, by customer name, and by sales territory. With just a few keystrokes, operators can instantly display records under a new sort (subsorts too) or find and output a given item.

B-TREE-P includes all necessary BASIC source code for a B-tree system that works with any file. Included are an insertion subroutine, deletion subroutine, lookup subroutine, previous/next subroutine, and complete instructions. Plus, you receive the source code for a complete demonstration system that uses B-TREE-P to maintain a name and address file, including an editor program for creating and changing name and address records, a browser program for displaying records, and a printer program for listing file items in order without having to wait for a sort.

To order, send your name, address, telephone number, and your check for \$395 (plus tax in California) payable to Semaphore Corp. at 207 Granada Drive, Aptos, CA 95003. Or call us at (408) 688-9200 for more information or to place a COD order. We'll send you complete B-TREE-P source code and all necessary documentation, along with all back issues of our special B-tree newsletter.

B-TREE-P includes a license agreement limiting your use of B-TREE-P to one computer at a time. Multi-CPU and OEM resale agreements are also available. Pick is a trademark of Pick Systems.

least a good keypad operator) can probably enter all 840 values for the three tables in no more than about 20 minutes, with another 20 minutes or so needed for proofing. If you can't quickly come up with the code for automatically generating the tables, you might as well just type them in.

Once you have the COST.CHART item completed (say, with the charges for zones 2 through 8 saved in attributes 2 through 8), it's a relatively simple matter to create a program that computes UPS ground charges:

```
UPS.CHARGES
001 OPEN "MD" ELSE STOP "No MD!"
002 READ ZONE.CHART FROM "ZONE.CHART" ELSE STOP "No zones!"
003 READ COST.CHART FROM "COST.CHART" ELSE STOP "No costs!"
004 LOOP
005 CRT "To what ZIP code": ; INPUT ZIP
006 UNTIL ZIP = "" DO
007 IF ZIP MATCHES "5N" THEN
```

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```
008 ZIP = ZIP[1,3]
009 POS = 1
010 LOOP
011 ZONE.ZIP = ZONE.CHART<1,POS>
012 WHILE (ZONE.ZIP < ZIP) AND (ZONE.ZIP # "") DO
013 POS = POS+1
014 REPEAT
015 ZONE = ZONE.CHART<2,POS>
016 IF ZONE # "" THEN
017 CRT "Total pounds": ; INPUT LBS
018 LBS = INT(LBS)
019 IF (1<=LBS) AND (LBS<=70) THEN
020 COST = COST.CHART<ZONE,LBS>
021 CRT LBS:" lbs. to ":"ZONE:" is ":";
022 CRT OCONV(COST,"MD2$")
023 END ELSE CRT "Bad weight!"
024 END ELSE CRT "Can't find zone!"
025 END ELSE CRT "Bad ZIP code!"
026 REPEAT
027 STOP
028 END
```

For a more finished package, you can add capabilities to handle air and express air tables, C.O.D. charges, Alaska shipments, and so on.

This month's mailbag

Editing gains, printing pains

In June, you published an article and source code for a screen editor. It took me a few months to get interested in keying it in, but once I did, I proceeded to modify it to operate on my AT version of Pick. I spent several

Why is using B-TREE-P better than using inverted files?

B-TREE-P can do many things that inverted files can't.

First, inverted files breakdown if the inverted list of identifiers grows beyond the Pick item limit of 32K, and can require slow sequential searches of those large items. B-TREE-P file items always stay very small and never run into any Pick size limitations.

Second, inverted files can only find actual keys known to already exist in the data. If you try to look up ZIP code 95003, and it's not in the file, an inverted file can do nothing more. But B-TREE-P can tell you the next closest match, such as ZIP 95005, and even identify any size "neighborhood" of adjacent records before and after the match.

Third, inverted files only allow searches for a complete key. With B-TREE-P, you can search for the name JOHNSON, or just JOH, or just the letter J, or as many characters as you want, and B-TREE-P will immediately find the closest match. If an inverted file tries to store all those substrings, it requires enormous amounts of disk space.

Fourth, inverted files cannot step sequentially through the index file. With B-TREE-P, you can start at any key, then step sequentially through all preceding or following keys.

Fifth, inverted files only allow searches for a primary key. With B-TREE-P, you not only can immediately retrieve the list of items all having ZIP 10020, you can also immediately find the one item with ZIP 10020 and an address of 207 BROADWAY.

Sixth, software for inverted files is tied closely to the data being indexed, and must often be modified if a new type of data file or field is to be indexed. But B-TREE-P "building block" routines never have to be modified, regardless of the application or type of indexing.

B-TREE-P is much more efficient, flexible, and user-friendly than inverted files.

For more information about B-TREE-P or to place an order, write Semaphore Corporation at 207 Granada Drive, Aptos, CA 95003, or call (408) 688-9200.

Questions Most Frequently Asked About STRIDE/Z

1. What is STRIDE/Z?

STRIDE/Z is an integrated package of manufacturing software for General Automation Zebra computers using the Pick operating system. STRIDE/Z is a product of Semaphore Corporation.

2. What software is included in the STRIDE/Z package?

STRIDE/Z includes 18 modules to automate every aspect of a manufacturing company: accounts payable, accounts receivable, cost accounting, customer service, engineering, fixed assets, general ledger, inspection, order entry, payroll, personnel, production control, programming, purchasing, receiving, shipping, shop floor, and stock room. The production control module includes regenerative Materials Requirement Planning.

STRIDE/Z consists of approximately 200 programs, 350 procs, 80 formatted screens, 655K bytes of online user documentation, and 225K bytes of online programmer cross reference documentation. The approximately 100 files in STRIDE/Z require 2.5 million bytes of disk space for installation. STRIDE/Z uses no assembler code.

3. Why is STRIDE/Z better than other manufacturing packages?

STRIDE/Z works. It was developed from scratch over a two year period at an actual electronics manufacturer, as sales climbed from \$10 million to over \$20 million.

STRIDE/Z has a clean, modular, well-structured, and conceptually integrated design. All design and implementation work was the effort of an individual programmer. Unlike other large software products, STRIDE/Z is not a collection of ad hoc patches and multiple programming styles.

STRIDE/Z simultaneously and correctly updates multiple files as soon as transactions are entered, in order to provide a database that is always up to date, and to avoid unfriendly batch-style processing.

STRIDE/Z is well-documented, especially for the programmer. Extensive cross-references carefully document all program, proc, and data

interdependencies, so that modifications are easy and predictable.

And STRIDE/Z is inexpensive.

4. How can I find out more about STRIDE/Z?

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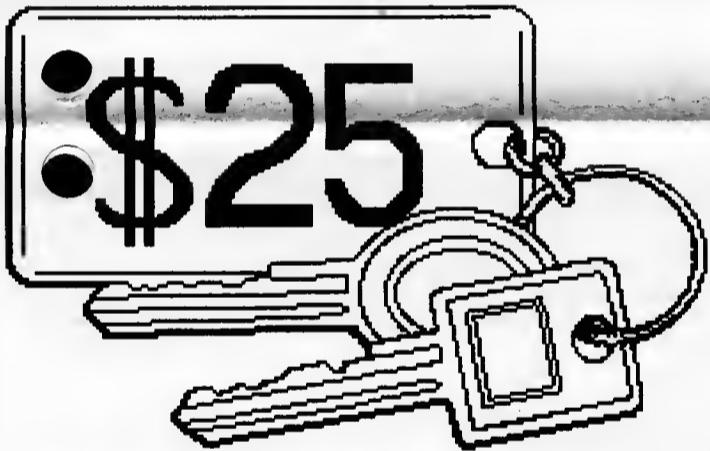
Semaphore Corporation welcomes its newest B-TREE-P customers: PEC Vectron Columbia County Industrial Indemnity

more weeks (part time) to enhance the screen editor with most of the suggestions you had, and added features like those in my favorite word processor that runs on my TRS-80 Model 4. The finished product certainly enhances my ability to be more productive with Pick.

In your November issue, Wes Martin of La Jolla asked if there was any way to stop the form feed at the beginning of every printout. Your response to use the S option with STARTPTR will only work with serial printers. If Mr. Martin has a parallel printer like I do, then there is no current way to eliminate the initial form feed when data is printed by Access. I have had some conversations with Pick Systems about this irritation and will forward a copy of Mr. Martin's comment to them. It is a real pain to waste a single sheet of paper when printing small reports. It is for that same reason that all three of the parallel printers I own have push instead of pull tractors.

Wesley S. Kar
Phoenix, AZ

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Pragma (not to be confused with *Pragma's Product Profiles*) is the original 48-page technical journal for Pick users published quarterly beginning in August 1982. Each issue is packed with software and helpful information, including complete and debugged program listings and detailed, explanatory articles for readers at all levels of experience. Order your **Pragma** issues today and begin unlocking the secrets in your Pick system!

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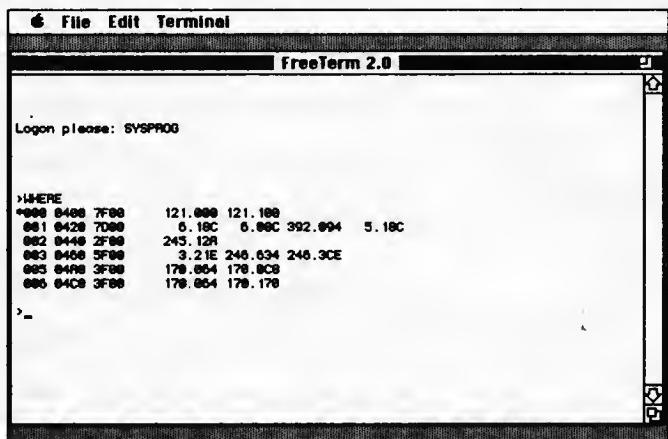
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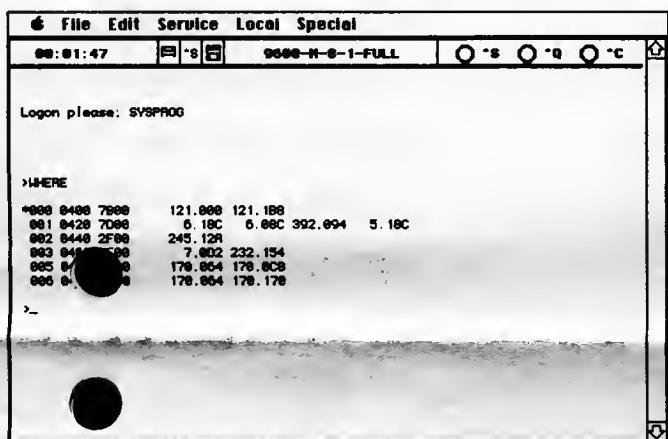
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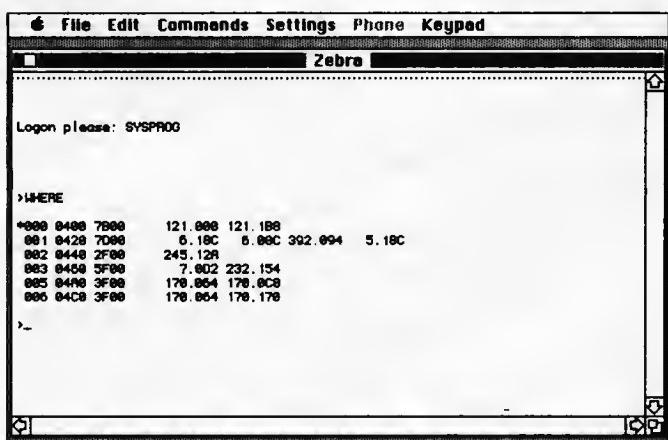
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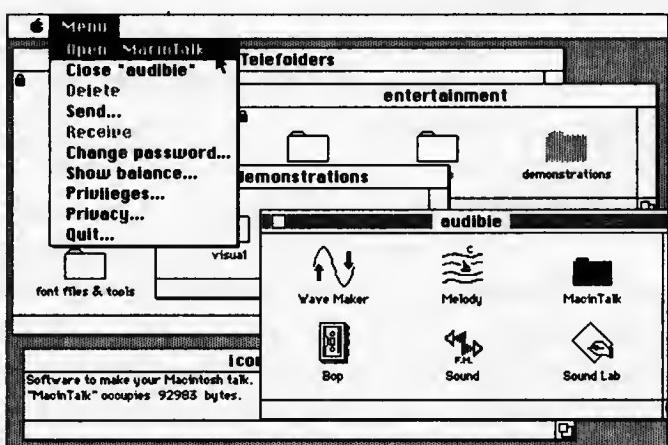
You can use FreeTerm: a simple text-only software emulator that turns your Mac into an ASCII terminal. There's no cursor control, but it does support X-on/X-off, and it's in the public domain.



Or you can use Red Ryder: a former try-before-you-buy "shareware" product, this software is now a commercial offering. It supports lots of protocols, but still doesn't do much more than let your Mac input and display text.



Or you can use MacTerminal: developed by Apple, this software turns your Mac into a complete (but slow) VT100 terminal. Still, it's only text-based, and all the power of your Mac goes wasted.



Or you can use Telefolders: sophisticated software that lets you tie your Zebra and Macs together, without losing the point-and-click power of the Macintosh interface. Mac files saved on the Zebra appear as standard icons, folders, and windows. To copy any Mac-style program, data, or document from the Zebra to your Macintosh, just click on the icon you want and select "Receive" from the Mac's pull-down menu. Each Mac also has access to its own private folder, for sending and receiving electronic mail via the Zebra.

Telefolders host software for the Zebra is \$995. A starter kit of Telefolders software for the Macintosh is \$49.95, and includes four free hours of access to Semaphore's own Zebra host, which features a large collection of Macintosh public domain software.

To order, or to receive more information, contact Semaphore Corporation, 207 Granada Drive, Aptos, CA 95003, (408) 688-9200.

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